DOCUMENT RESUME

ED 061 025 SE 009 961

AUTHOR	Waldo, Dwight
TITLE	Some Issues in Preparing Science Administration Leadership for Tomorrow.
INSTITUTION	George Washington Univ., Washington, D.C.
SPONS AGENCY	National Aeronautics and Space Administration, Washington, D.C.
REPORT NO	OCCAS-Pap-6
PUB DATE	Dec 69
NOTE	25p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Administrative Personnel; *Administrator Characteristics; *Research Directors; *Sciences; Social Factors; Social Values

ABSTRACT

The report attempts to assess events now in progress, discern future trends, and explicate emerging problems, with the end in view of making tomorrow's science administration and leadership more successful. The major points considered include the following: the environment of the science administrator-leader is becoming increasingly unstable, problematic and political; that, accordingly, his role and functions are subject to substantial change and redefinition; and that it is possible in a tentative and general way to speak to the knowledge, attributes and skills the science administrator-leader of the future will need. (Author/PR)

ED 061025

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

Dwight Waldo

SOME ISSUES IN PREPARING SCIENCE ADMINISTRATION LEADERSHIP FOR TOMORROW

December 1969

Program of Policy Studies in Science and Technology
The George Washington University
Washington, D. C.

Occasional Paper No. 6

SE 009 961

The views expressed in this paper are those of the author. They do not necessarily reflect the views of other members of the Program of Policy Studies in Science and Technology or of the Program's sponsors.

SOME ISSUES IN PREPARING SCIENCE ADMINISTRATION LEADERSHIP FOR TOMORROW

Dwight Waldo

Remarks prepared for delivery at the
National Conference on Public Science Policy and Administration
(The University of New Mexico Program for
Advanced Study in Public Science Policy and Administration)
September 8-9, 1969

Program of Policy Studies in Science and Technology
The George Washington University
Washington, D. C.
established under NASA Research Grant NGL 09-010-030

Occasional Paper No. 6

ABOUT THE AUTHOR

Dwight Waldo has been Albert Schweitzer Professor in the Humanities at Syracuse University, Syracuse, New York, since 1967. He was previously Director of the Institute for Government Studies at the University of California, Berkeley, from 1958 through 1967. Dr. Waldo served as Vice President of the American Political Science Association during 1961-62. He has served as Editor-in-Chief of the Public Administration Review since 1966. Dr. Waldo is the author of the following books: The Administrative State (1948); The Study of Public Administration (1955); Perspectives on Administration (1956); and Political Science in the U.S.A. (1956).

Contents

An Environment of Quickening Change
and Increasing Turbulence 3

Some Centrally Relevant Current Phenomena 6

The Anti-Organizational Revolution. 8

A Sea Change: Shifts in Values and Interests
in Disciplines, Philosophy and Science 10

Speculations on the Future of Science
Administration Leadership 13

SOME ISSUES IN PREPARING SCIENCE ADMINISTRATION LEADERSHIP FOR TOMORROW

by

Dwight Waldo

Despite the modest "Some--" that introduces my title, I shall interpret my charge to be the global one of assessing events now in progress, discerning future trends, and explicating emerging problems, with the end in view of making tomorrow's science administration and leadership more successful.

In trying to fulfill this assignment I shall say some trite things--because they are nevertheless important--and some silly things--because I can't help it. This is not modesty, false or other. It takes but little acquaintance with the literature of "futurizing" to appreciate that even the greatest successes are also partial failures. Some specific predictions, for example, manned space-flight, are sometimes very accurate. But some of the most successful predictions about societal movement generally, such as those of Marx and Comte, are simultaneously invalid, ludicrous. And many think, dangerous as well.

In trying to impose some order on the many things that seem relevant to the subject I shall argue:

1. That the environment of the science administrator-leader is becoming increasingly unstable, problematic and political.

2. That accordingly his role and functions are subject to substantial change and redefinition.

3. That it is possible in a tentative and general way to speak to the knowledge, attributes and skills that the science administrator-leader of the future will need. "Possible"--but not necessarily reassuringly or programatically helpful in any easy way.

Before turning to the first theme, some words about two troublesome problems in definition and understanding.

First, administration and leadership, which are juxtaposed in my title, the former modifying the latter. I shall assume that these two terms do not mean the same thing, "administration" suggesting activities more or less subject to rules or science, "leadership" suggesting something more creative, fluid and dynamic. But I shall also assume that the two terms are not mutually exclusive, that their joining was for a purpose, and that the purpose was to license me to address the wide span indicated by both terms.

Second, science and technology. I am not formally directed to speak to technology. But much of what is said will concern technology, not science in a strict sense. I am assuming that "science" is a shorthand designation, meaning science and technology, pure and applied science. The relationships between these terms and the concepts and activities to which they refer is, of course, complex and controversial. I shall assume that our business today is not primarily and frontally to explore the complexities and to resolve the controversies, however important they are for some purposes.

An Environment of Quickening Change and Increasing Turbulence

It is hardly news that we live in an environment of quickening change and increasing turbulence. To note the main causes and dimensions is, however, a necessary prelude to understanding the future needs of science administration-leadership. I shall catalog roughly and without distinguishing sharply between cause and effect, between what we might agree are problems in an objective sense and contemporary phenomena that some of us think are objective problems but others regard as attempts to solve problems. It is of the essence, however, that what is a problem and what is a solution tend to become confused and controversial, is itself a cause of controversy and even violence.

At the global level there are the following major and reasonably "objective" problems:

1. A threat of violent encounter of a type which would annihilate a sizable fraction of humanity immediately and much or all of humanity ultimately. Or at least destroy civilization "as we have known it," and degrade what human existence remained.

2. A population explosion threatening at best misery and at worst extinction for hundreds of millions, perhaps billions, of humans.

3. The depletion, or depletion relative to expectation or need, of the earth's non-renewable resources.

4. The spoliation and contamination of the bio-sphere, making human life increasingly unpleasant, dangerous, and short.

Two points before proceeding with the inventory:

1. These problems--and the ones that follow--are not separate, discrete. Each interacts with, "causes" or at least intensifies and complicates the others.

2. Science-technology is deeply implicated as cause with each and every one of these problems. You might dispute that, but that science-technology is at least perceived as causal is centrally relevant to much now happening and to happen in the future.

Stepping down from this "objective" level but still surveying and generalizing very broadly, there are the following problems (or causes of change and turmoil):

1. The new--but now already old--Revolution of Rising Expectations: The fact that hundreds of millions of people on all continents want and expect to have more of the material goods of life. This is a new ingredient in history.

2. The division of much of the power and influence in the world between competing and more or less hostile political ideologies and systems.

3. The division of the world into more than a hundred so-called nation-states, each nominally an independent unit; or put conversely, that there is for the world no effective over-all political-economic-social system or organization.

One point before continuing:

A natural scientist might say: At least these are your problems--they're "soft science" problems. True in a way. But these second-order problems are inextricably related to the first-order problems, have a scrambled cause-and-effect interaction, so the natural scientist is inevitably implicated, however "innocent."

Narrowing down to national problems, a rough and incomplete inventory:

1. The decay of the central city; beyond that, urban blight and suburban sprawl; and beyond that the problem of finding a design, style and "arrangements"--technical and human--for increasing and increasingly large agglomerations of people.

2. The "generation gap," a chronic problem in human mechanics that has assumed acute proportions in this period, with serious repercussions for all primary and secondary societal institutions.

3. A racial-ethnic problem which centers upon the status and ambitions of blacks but reaches out in concentric circles of involvement, action, interaction and reaction.

4. An interrelated Crisis in Values and Crisis of Authority.

5. Escalating crime and lawlessness and a building potential for more.

6. An "information explosion" and "communications overload."

Again, some observations:

1. I am not suggesting that these six "problems" are limited to the United States or that they are separable from problems in the previous two lists. On the contrary, these problems are more-or-less world wide and they intertwine with problems on the other two "levels."

2. I don't claim that these six problem areas are necessarily the most important, or that I have stated them in the most precise or revealing way.

3. I don't claim--of course--to have stated all the serious problems. A further list--or lists of others--would include, just for example:

1. A problem in control of the military, or more generally a so-called military-industrial complex, both at home and overseas. (To some, the problem is the reverse: controlling the non-military-industrial complex.)

2. A problem in the delivery of social services, or more broadly, creating "social equity."

3. A problem in the power of government to govern, to maintain legitimacy and deliver what is expected or desired.

4. A problem in maintaining order and/or relevance and effectiveness in educational institutions.

I break off enumeration. But obviously a listing could be indefinitely extended: drug use and narcotics addiction, air safety and convenience, unemployment and inflation, refuse disposal or reuse, organ transplants, child abuse, and on and on. The problems in a large and complex civilization parallel the size and complexity. Or, pessimistically, exceed them.

My listing, what I chose and how I put it, has been more or less arbitrary, the more so as I proceeded. It is important to appreciate that not just idiosyncrasy but contention is involved. What is one person's problem may be another person's solution, and vice versa. The Catholic Church has its solutions for the problems of overpopulation, but to others the Church is part of the problem. A ballistic missile Safeguard system is to some a serious problem, to others the opposition to it is a serious problem. Hippies to some are at best drop-outs from the serious business of running a civilization, to others they are the Hope of the Future.

Some Centrally Relevant Current Phenomena

Up to now I have been sketching the broad context of change and turbulence in which the work of science and technology is going to be carried on. I want now to speak to some matters that strike me as very important in the future of the scientific-technological enterprise, in relating this context of change and turbulence to the emerging role of the administrator-leader.

The New Romanticism. Presently there seems to be under way a change in mood, action, thought, and total life-style and weltanschauung similar in many ways to the Romantic reaction of the late eighteenth and nineteenth centuries. Romanticism as a reaction to the rationalism and classicism of the eighteenth century exalted feeling as against reason, the senses as against

the mind, individual spontaneity, creativeness and self-fulfillment as against convention and rules. It saw man as inherently good but corrupted by bad institutions, "natural man" as better than "civilized man," "simple man" as superior to "sophisticated man." It admired the self-centered and even violent Hero. In philosophy it emphasized will and emotion as against rationality. It sought to "break out" and start again on sounder foundations.

The parallels to contemporary developments are many and striking. It is beyond my purpose and talents to draw them out at length and in fine. But across a large expanse and many sectors of the human enterprise--I speak of the West and especially the United States--the parallels exist: in music, in art, in literature, in philosophy, in manners and morals, in social and political movements. Of course, history never repeats, and one risks error and foolishness in pushing the analogies too far. Also, if historical comparison is the game, it is just possible that a better--and more pessimistic--comparison would be the contemporary United States with second and third century Rome. But in what follows I shall assume the existence of movements akin in their nature and import to those of Romanticism.

Given any general validity to the thesis, the import is clear: resistance to and trouble for scientific-technological enterprises: Science is closely engaged with rationality and discipline, it is mind as against emotion. It is (that is, perceived as) demanding, impersonal, abstract. Its spawn or ally is technology: cold, impersonal, artificial, meretricious, dehumanized and dehumanizing. Both science and technology, in a combined creator-and-created relationship, are a part of the Establishment. And the Establishment is the Enemy. It causes wars, supports brutalizing tyrannies, destroys and pollutes the earth, permits needless deprivation and suffering, squeezes out the joy-of-living in a mad, senseless scramble for power, wealth

and material goods--these at the same time it professes noble ideals and even claims Divine sanction.

Of course, I over-simplify and perhaps I exaggerate. But four hundred thousand young people did not recently gather at Oak Ridge to celebrate science, nor at Cape Kennedy to celebrate technology, nor in Washington to celebrate American policies and power, nor on Madison Avenue to celebrate the American Standard of Living. They gathered in a cow-pasture to celebrate individual and collective release from or opposition to the Establishment. My reading is that the overwhelming majority at Woodstock thought the moon-landing was not a triumph of science, technology and the human spirit, but at best senseless gadgeteering, at worst criminal folly.

Some sober observers thought they saw at the Woodstock Music and Art Fair the lineaments of future America. I make no unqualified predictions, but let me put it this way: A few years ago, impressed with the growing importance and scope of science in American life, I predicted half-seriously that by the 1980's we would elect a scientist-turned-politician as President. But in a year in which Norman Mailler, not Isador Rabi, seeks the mayoralty of New York City I withdraw the prediction.

The Anti-Organizational Revolution

In 1953 Kenneth Boulding published a book titled The Organizational Revolution. At base, the argument was that we live in a period of greatly increased "organizationness"; that for a number of historical, socio-economic factors we are experiencing an increase in the number of organizations, the size of organizations and in the intensity of organizational phenomena. I suggest that an appropriate and needed book at the present time is one titled:

The Anti-Organizational Revolution, arguing the thesis that we have entered a period in which the factors of erosion and decay in organizational life are now in ascendancy.

The argument would run as follows: An abundant and complex organizational growth depends unpon support and encouragement from the socio-economic substructure. Because there was such support and encouragement earlier there was an efflorescence of organizational life. Recently, however, the basic social institutions are changing in a less "supportive" direction, and various currents of thought and action in our national life are either indifferent or hostile towards organizational phenomena.

Much of the work of Max Weber was concerned with tracing out the "supportive structure" for bureaucratic organization, which he regarded as the most rational and efficient way of relating human beings for the accomplishment of specific goals. As he viewed it, bureaucratic organization rose and flourished only in a complex social milieu, with relatively advanced religious, economic, educational and legal institutions. Bureaucracy assumed and needed a certain type of personality structure. To function optimally in an organization the members must have the ability to accept and impose discipline, an orientation towards punctuality, efficiency, productivity, and "bureaucratic virtues" generally. Such qualities, while they may be reinforced in a bureaucratic organization, are basically the products of society--first of all of the basic societal unit, the family.

The argument pro and con is broader than "bureaucratic organization"--other types of organization may be more appropriate to (and more "efficient" for) other social arrangements, life-styles and personality structures. But the reference to bureaucratic organization and the social substructure necessary

to support it makes the point: If, as I judge to be true, there are currently significant changes in the societal substructure of our predominately bureaucratic-type organizations, then these organizations are experiencing, and will further experience, stress and change as the result.

Now I submit that many of the phenomena that constitute the New Romanticism are a part of or further an Anti-Organizational Revolution. Organization is the Establishment and the Establishment is Organization. Specific organizations are instruments of evil: they invent fiendish devices of killing, force young people into the sordid and dangerous business of war, plunder and destroy the natural world, threaten to destroy all life--and educate for and justify all this. More, the very "organizationness" of our society, apart from the evils of specific organizations, narrows and cripples, takes away our freedom and spontaneity, squeezes life dry. So, "Drop out, tune in, turn on."

To make my point, again I over-simplify--though at the center of the Hippy Movement I scarcely exaggerate. Suffice it now to say that the argument could be developed at length and with much evidence, treating a wide range of institutions and calling in supporting data from varied fields.

A Sea Change: Shifts in Values and Interests in Disciplines, Philosophy and Science

Related to the New Romanticism, woven into it--and important for the tasks of science administration-leadership in the future--are significant shifts in values and interests in disciplines, in philosophy and in the enterprises of science and technology. In broad terms there is a shift away <u>from</u> "scientism," positivism, and value neutrality or indifference, <u>towards</u> humanism, value concern and orientation, and "policy"; in still broader if more uncertain and arguable terms, from the abstract and rational towards the con-

crete and affectual.

In those fields in which I am a dues-paying, accredited member, political science and public administration, these trends seem indubitable. In political science the movement has resulted in the formation of an organization titled Caucus for a New Political Science, still a part of the American Political Science Association but seeking to permeate and control the Association. The Caucus is more or less "New Left," which means that some members hold rather "extreme" political views; and significantly, it is on the whole a "youth" movement against an alleged political science Establishment. But it is not simply a Youth Movement, nor is it solely concerned with immediate and contentious issues of public policy. It is also in significant measure a revolt against positivism and "scientism" (though most would probably deny it is against <u>science</u>) and a cry for "relevance," human concern, and personal-professional involvement. In public administration--in some ways a part of but in some ways independent from political science--similar currents move in a similar direction. But not yet so strongly--at least there is not yet a Caucus for a New Public Administration within the American Society for Public Administration.

Somewhat similar movements stir also, as I understand it, in anthropology, sociology and even economics. Also in psychology and social psychology, where there is--especially among the young--a vogue for the personal-affective and the "humanist" psychologies. And in the professional schools--and not just in social welfare and public health, but in engineering, law and even medicine.

In philosophy--again as I perceive it as an amateur and outsider--similar currents move in similar directions. While they have scarcely dis-

appeared, the various varieties of positivism have become more refined and defensive, and are increasingly perceived as arid or irrelevant; and phenomenology, existentialism, and now the "new" existentialism have moved towards the center of the stage. Of central relevance is "philosophy of science." Here, as I read the situation, there is less dogmatism, more flexibility, than a generation ago. At core is the fact that the conception of natural science as a value-free activity is suspect or openly challenged. The doubt, the ferment, spills over into--and perhaps flows from--the very centers of "hard" scientific activity. Only on the broadest construction of the term science am I a scientist, but I do "read at" such publications as Science and the Bulletin of the Atomic Scientists. And what I find there is much evidence of concern about the "social relevance" of science and technology, with social problems generally. The End of Innocence experienced by atomic physicists with Hiroshima is now a spectrum-wide phenomena. I remind you of the call from M.I.T. last spring for a national "day of reflection" for all scientific researchers.

Before trying to discern some of the implications for science administration-leadership, a word on three points:

1. In what I have said about the New Romanticism, the Anti-Organizational Revolution, and Shifts in Values and Interests--and before that, the troubled world and national environments--I have not meant to assert, or even imply, that the "world as we now know it" is about to disappear. Conceivably that could happen; but in that case, all bets are off. The enterprise we call civilization has customarily been more or less unstable. The first Romantic Movement did not sweep away the world against which it posed itself,

but interacted with it to produce a new synthesis--or mixture. I do not expect the New Romanticism simply to sweep away the world to which it is opposed. Far from it.

2. But--and this is my second point--I do expect it to change established institutions and life styles, in some ways extensively. To the extent I am correct in what I have observed, there are implications of the greatest import for the future of scientific-technological enterprises--and for their administration.

3. There is, as I see it, a connection between my earlier inventory of problems and my later observations on the New Romanticism, the Anti-Organizational Revolution, and the Sea Change in intellectual orientation. The latter transform or transmit the former, insuring that they will become in the most professional way problems of science and problems in science. And thus of its administration-leadership.

Speculations on the Future of Science Administration-Leadership

Now I am going to speculate on the implications for the future of science administration-leadership of my reading of the situation. I will put my speculations in the form of predictions, but this is only literary convenience and not intellectual certainty. I shall proceed by numbered and lettered "points," but this too is only a stylistic or psychological convenience. It does not necessarily reflect order of importance or causal or logical relationship.

1. Science and technology will become increasingly politicized and hence their administration-leadership increasingly politicized.

First, a caveat: All disciplines and professions tend to structure the world in terms of their own concepts and procedures. Thus lawyers and engineers when brought up against a problem in government tend to see it as a problem in law or engineering. I am specialized in political science and public administration. You will have to judge whether in arguing this point I am merely reflecting this background and orientation, trying to put things into a familiar mold.

In general, the argument is that science and technology always have important relations to a social context; that in a complex society these relations are complex; that there are many forces now at work to make these complex relations troubled, problematic, even turbulent; that government is the central institution concerned with the "authoritative allocation of values," and that this is what "politics" is about; that this defining phrase for the governmental-political defines or describes also much that is going to happen in science and technology; and that the political and the scientific are going to be more closely and obviously--and contentiously--joined.

2. The increasing politicization of science and technology will include the following aspects, dimensions and problems.

(a) Across a wide spectrum there will be increasing contention between "pro" and "anti" science and technology forces. On top of a long, secular build-up of science and technology the last generation has seen a sharp upward spurt, some claimed a logarithmic progression. Recall the highly quotable and portentous statement of a decade ago: Ninety percent of the scientists who ever lived are living <u>now</u>. But now there is a vigorous counter-revolution, ranging from Luddite lets-go-dirty-and-let-our-hair-grow movements to sophisticated arguments that we should now put more resources into the arts and

humanities and/or that science and technology should be basically reoriented to work on new problems, say from national defense to the inner city. NASA's "post Apollo" problem is symbol and harbinger. The society which, preeminently in history, is the most oriented towards science and technology is now experiencing a revolt against science and technology. The science administrator-leader will have to be aware of, allow for, and perhaps help "treat" this cultural schizophrenia.

(b) While there will be broad resistance and contention, controversies in some specific areas will be intense. As suggested, the space program will be one of these. Others, for example and obviously, will be weapons research and biological research touching important ethical issues and religious sentiments.

(c) There may well emerge a really massive political sentiment and push against private decision-making with regard to technological proliferation and expansion, to the extent that this is perceived as causing social problems, plundering resources, polluting the environment, narrowing and endangering life. If so, it is hard to see how this can avoid movement towards greater organization and control; and this would seem to mean more and stronger government.

(d) But against this, there are important factors of resistance, apart from the automatic and obvious one of economic interests, personal and corporate. These are (1) the fact that the New Left has joined the Old Right in deprecation or condemnation of government in general and (2) the current vogue for "local" decisions and programs, whether private or governmental, and for "participation" in organizational decisions on the part of members generally.

(e) There will be a severe problem of making the scientific mind and the political mind mesh. There is a fair amount of writing holding that the scientific enterprise and the political enterprise are radically different, the one shaped by controlled experiments, theoretical models, and the quest for reliable knowledge, the other oriented towards action, and necessarily operating within short time spans and with imperfect information. Scientists can, obviously, become politically skillful; but a naivete wrapped in unawareness of itself is likely to characterize a scientific venture into politics. An important function now is and increasingly will be that of translation and communication between worlds.

(f) Much of what will transpire can be put under two analytically distinct but often empirically joined processes.

(1) The making of policy for and about science and technology. This involves, prominently, what resources will be used, for what ostensible ends, by whom, where, using what institutional media.

(2) The use of science in making and executing government policies generally. This involves such questions as what scientists shall have what authority or weight, the relation of facts and values, or more broadly (or relatedly) the role of science in policy making, the structuring of roles and authority in society generally, the old issues implied by "expert versus amateur."

(g) As the latter more or less implies, the recent and present great emphasis upon decision-making processes and techniques will continue and expand. These represent, most fundamentally, an attempt to "join" the world of science and the world of non-science, to meld hard science and soft science, to use scientific findings and scientific techniques in making and executing

policies for society. To me, this is the significance of a multitude of concepts, techniques and technologies: policy science(s), PPBS, simulation, cost-benefit studies, scanning, etc. Their tribe will increase.

3. The Culture of Science will become more turbulent, and part of the job of the administrator-leader will be understanding and coping with this increasing turbulence.

I use the phrase Culture of Science as a short-hand designation for complex and diverse matters, hard to encompass with few words: in general, orienting beliefs, institutional arrangements, and procedures for getting work done and results disseminated.

Part of the turbulence may be thought of as self, or internally, generated, from the dynamics of scientific development itself: new discoveries, new specialties, new techniques, skills, ideas. This is a continuing process, but the present <u>size</u> of the scientific enterprise and the increasing <u>speed</u> of change create new aspects of an old phenomenon.

But much of the turbulence will be transmitted from the environment. Science as a central institution of society can scarcely be spared the contention and turmoil of society, the more so when science is perceived as both cause of evil and hope for remedy: worse, when there is serious societal disagreement on <u>what</u> is evil and <u>what</u> is remedy.

The implications are many, and just to suggest a few:

(a) Controversies about pure versus applied, fundamental versus mission-oriented research will become intensified.

(b) Controversies about the institutional base and/or geographic location of research will become intensified. The disturbed university, for example, may become a less used and less useful habitat; conversely,

the presence of the scientific enterprise will contribute to turmoil in the university. We have, of course, already seen the beginning of this interaction.

(c) Resistances to and controversies over technology, how and where and what shall be applied, by whom, for what ends, to whose advantage or disadvantage, will "back up" into science. This also is not new, but it will increase tremendously.

Nothing less is involved, as the participants in the struggle for the use of science and technology believe, than the future of mankind. Science will not be allowed to remain a self-directing enterprise--to the extent it ever was or now is.

4. The Culture of Administration will change significantly, and some of the change will be a result of and be accompanied by increased turbulence.

Some of what I call attention to is not new. It represents the application of old theories, the solution of continuing problems, the extension and amplification of present trends. It concerns such matters as the extension of what Frederick W. Taylor called "functional foremanship," the "authority of knowledge" or expertise, the use of project or team organizational modes, in general the "flattening" of organizational charts, the transformation of bureaucratic organization into looser, less hierarchical, forms.

But older theories and trends now interact more swiftly and strongly with theories and trends from the larger environment, an environment increasingly agitated; and much of the agitation is related to the New Romanticism, the Anti-Organizational Revolt, and the Sea Change in values and styles.

The effect of the new upon the old will be, in general, to further decentralization as against centralization, autonomy as against control, personal

or group decision-making as against "authoritative" decision-making by what have been regarded as authoritative decision-makers for organizations, indeed for society. The drive for "participation," already an aspect of the laboratory, will be intensified, and may well be joined by the "confrontational" mode.

But--I remind you of an important seeming inconsistency or contradiction noted above: There is evidence, supported by "good logic," that many problems cannot be addressed, much less solved, on an individual or small group basis, that they are societal problems that must be solved on a society-wide basis; and this clearly implies society-wide, "authoritative allocation of values." The clashing of "centralism" and "decentralism" is hardly new, but in the period ahead it will certainly be confused, loud, and heated.

Incidentally, the distinction I have made between the Culture of Science and the Culture of Administration is sharper than the existential world--there one blends into the other. In general, it should be understood, my analytical distinctions are not empirical separations. As I view it--at least --there is a "relatedness," an "interrelatedness," in all the seemingly disparate things to which I have directed attention.

Finally: I have tried to foresee, to anticipate. But the future is always reached from the present, we always live now, and even in a revolutionary period much of the present--even the past--is carried forward. Nothing I have said has been meant to belittle present accomplishments or to argue to the irrelevance of the present state of the arts and/or science of administration. Budgets still must be made and executed, people still must be hired and paid, supplies and equipment must still be procured and delivered, space

and transportation still must be attended to. Short of the millenium nothing will abolish all such matters. Future developments will change them. But assuming the continuance of the complexity we identify with civilization they could not simply disappear.

But if I have been only half correct in my assessment, they will be done in an increasingly fluid and problematical milieu, indeed in one greatly confused and disturbed. It is obvious that the science administrator-leader in that milieu cannot be simply a technician. He must be increasingly concerned with substantive issues and with the policy-making process. He must be increasingly a negotiator and a translator, perhaps a therapist. He must be increasingly sensitive to ethical, social, economic and political issues. He must be knowledgeable about and a student of science and technology. And, of course, first and continuously, a student of his own technology, administration--which means much of the enterprise of social science.

On top of all this--or as a result of all this--he will be, one hopes, what in an old vocabulary is called a Wise Man, even a Statesman.